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Donald C. Brittingham
Director – Wireless/Spectrum Policy

June 3, 2004

Ms. Marlene Dortch
Secretary
Federal Communications Commission
445 12th Street, S.W., Room TW-A325
Washington, D.C. 20554

Re: *Ex Parte* Presentation
WT Docket No. 03-103; "Air-Ground Telecommunications Services"

Dear Ms. Dortch:

Verizon Airfone submits for the record in the above-captioned proceeding a technical paper by Drs. Anthony Triolo and Jay Padgett of Telcordia entitled "Coexistence Analysis for Multiple Air-to-Ground Systems." This paper fully evaluates the proposals made by AirCell and Boeing concerning the use of the 800 MHz Air-to-Ground ("ATG") spectrum and clearly demonstrates that these proposals would not support multiple broadband service providers in the four megahertz of ATG spectrum. The paper provides additional technical support for Verizon Airfone's proposal in this proceeding that the Commission amend its rules to permit Verizon Airfone to offer broadband service in the ATG band. Finally, this letter addresses the proposals of Space Data for use of the 800 MHz band.

AirCell has proposed a scheme to support sharing of the ATG bands by two separate service providers, each having access to 1.25 MHz of the 2 MHz available in each direction. AirCell's proposal is to invert the duplexing for the second provider, so its aircraft would receive in the 895 MHz band and transmit in the 850 MHz band. Boeing has suggested the use of adaptive antennas on all aircraft and base stations to alleviate the interference problems inherent with multiple, broadband use of ATG spectrum. Space Data has proposed that the Commission reallocate spectrum from the existing cellular allocation and possibly other land mobile allocations to make provisions for a CDMA ATG system and a GSM ATG system. The Space Data scheme also contemplates use of "stratospheric platforms" to communicate directly with individual handsets aboard aircraft while providing secondary service to the land-based mobile users. Space Data also urges the Commission to reverse the air-to-ground and ground-to-air duplexing. Unlike AirCell, Space Data would have this change made throughout the band.

AirCell Proposal. The technical models and analysis in Telcordia's paper demonstrate that:

(1) AirCell relies on textbook assumptions for equipment performance and propagation, with no allowance or sensitivity analysis to account for imperfections such as fading, errors in antenna alignment, and equipment implementation losses;

(2) AirCell fails to consider the harmful effects of base-to-base station interference that would undoubtedly occur with its proposal;

(3) AirCell severely underestimates aircraft-to-aircraft interference because its analysis does not reflect real-world conditions;

(4) AirCell's analysis artificially constrains the maximum transmit power resulting in the understated interference potential it reports; and

(5) AirCell fails to consider the overwhelming interference effects of the AN/SPS-49 air search radar systems deployed extensively by the U.S. Navy.

As a result of these flaws, AirCell's analysis significantly underestimates the harmful interference effects associated with reverse-duplexed sharing of the ATG spectrum. Telcordia's simulation discussed in the attached paper takes into account a number of real-world factors that AirCell omitted including: (1) non-uniform geographical distribution of air traffic; (2) sectorized base station antenna patterns; (3) sectorized antennas on the victim aircraft with a best-beam selection system; and (4) actual existing base station locations. When the AirCell proposal is appropriately modeled in this fashion, the Telcordia analysis makes clear that (1) base-to-base interference effects will be present in most airport environments; (2) the Navy radar system will effectively eliminate the communication ability of a reverse-duplexed system; and (3) the harmful interference effects on each of the two ATG broadband systems are significant despite the mitigation measures incorporated into the simulation.

The conclusion is that a reverse-duplex arrangement for spectrum sharing is not viable in the ATG spectrum.

Boeing Proposal. The technical analysis of this proposal demonstrates that:

(1) Reasonably sized adaptive antennas cannot eliminate harmful interference between multiple broadband providers in the ATG spectrum;

(2) Any adaptive array system will add significant size, weight and power consumption requirements that would not be practical in an aviation environment; and

(3) There are no commercially available adaptive array systems for ATG broadband communications applications, and the development of such systems would result in a significant delay in bringing broadband ATG services to the marketplace.

Boeing's analysis fails to consider typical airport environments and aircraft flight patterns. When studying such real-world situations through use of a simulation, it is clear that massive adaptive antenna arrays would be necessary to avoid harmful interference with multiple, frequency overlapping ATG systems. Such arrays are impractical for commercial ATG systems. Even if a reasonably-sized array could be developed to eliminate the interference effects associated with the Boeing proposal, the complexity and time-to-market delays associated with developing such technology would prevent such a system from being commercially viable.

Space Data Proposal. Although not addressed directly in the Telcordia paper, Verizon Airfone notes the significant flaws associated with Space Data Corporation's recommendations. First, the Space Data proposal to reverse the ground-to-air and air-to-ground bands is untenable for this would expose receivers in aircraft to radar interference of the sort noted by Telcordia with regard to AirCell's proposal. Even if the bands were not reversed, however, "stratospheric platforms" would be susceptible to receiving radar interference potentially more debilitating than that now occasionally encountered by current ground stations at low antenna elevations.

Second, the proposal to implement handsets that would operate aboard aircraft in the ATG bands as expanded into the cellular and/or SMR bands is fraught with problems. Not only would such handsets be more expensive, their use would require a major change in airline, FAA, and FCC policies. Under a scheme in which such handsets communicate directly with facilities outside of the aircraft either on the ground or carried by "stratospheric platforms," the airlines would lose a large measure of needed control over the electromagnetic environment aboard aircraft in order to support the safe operation of the aircraft. Moreover, the reallocation of spectrum for the Space Data scheme is beyond the scope of the current notice of proposed rule making, and would embroil the Commission in a protracted proceeding against existing terrestrial licensees. Such a move would set back by years the opportunity to implement rules that would facilitate terrestrial broadband based ATG service in competition with the existing and proposed satellite ATG service. In short, the Space Data proposal would bring problems, not broadband service, to the ATG environment and should be rejected.

Verizon Airfone has been a pioneer in the development of ATG service. It remains the only regularly licensed operator in the ATG bands. Others have entered the market and then turned in their licenses after concluding that they did not wish to devote the time and

resources necessary to providing this service. Verizon Airfone, however, has not only persevered in the provision of service, it has successfully tested broadband service on an experimental basis and stands ready to bring regular broadband service to the flying public throughout the nation in a remarkably small amount of spectrum. Accordingly, Verizon Airfone urges the Commission to move forward expeditiously to revise the rules to permit it do so in competition with satellite providers who are not encumbered by the same spectrum limitations that the licensee of a terrestrial-based system would face.

Sincerely,

/s/ Donald C. Brittingham
Donald C. Brittingham

cc: Julius Knapp
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